Etter Bridge (Bridge 740)
CSAH 68 over Vermillion River
Hastings Vicinity
Dakota County
Minnesota

HAER No. MN-74

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

ETTER BRIDGE (BRIDGE 740)

Location:	Spanning Vermillion River at CSAH 68, Hastings Vicinity, Dakota County, Minnesota
UTM:	15:521045:4945680
Quad:	Diamond Bluff West, Wisconsin-Minnesota (7.5 minute series)
Date of Construction:	1914-1915
Present Owner:	Dakota County
Present Use:	Vehicular highway bridge
Significance:	Etter Bridge is a rare surviving pin-connected camelback through truss built from early plans of the Minnesota Highway Commission. The commission began issuing standardized plans in 1911. The bridge, which dates from 1914-1915, exemplifies the commission's efforts to standardize bridge design.
Historians:	Charlene K. Roise and Shawn P. Rounds Hess, Roise and Company, Minneapolis, Minnesota January 1994

Etter Bridge, also known Bridge 740, is in Section 21 of Ravenna Township in Dakota County. Located just 1,920 feet from the Goodhue County line, this 150-foot, single-span, eight-panel, pin-connected, camelback through truss carries Dakota County State Aid Highway 68 over the Vermillion River near its mouth at the Mississippi (Figure 1). The highway enters Etter, now a rural crossroads, from the west, then angles northeast to cross the bridge. Although passing through a relatively undeveloped, forested region, the road is heavily travelled, since it serves as a short-cut between the Minneapolis-Saint Paul metropolitan area and Treasure Island Casino on the Prairie Island Reservation. Stop signs at both approaches to Etter Bridge regulate traffic flow over the one-lane structure.

Ravenna Trail (County Road 54) leads north and west from Etter along the Vermillion River's western bank to the City of Hastings. Ravenna Township is edged by the City of Hastings and Marshan Township to the west, Goodhue County to the east and south, and the Mississippi River to the north.

Originally part of Hastings, Ravenna Township became a separate entity in 1860. A 1910 history of Dakota County described Ravenna as "the model town of the county. There was always money in its treasury."[1] It was settled by Irish immigrants beginning in 1852, after the native Sioux tribe signed a treaty ceding the area to the United States. At about that time, the state's first surveyed military road opened from Hastings to Wabasha, passing through Ravenna Township in a roughly northwest to southeast direction. Soon, the route extended from Mendota

[1] Franklyn Curtiss-Wedge, ed., History of Dakota and Goodhue Counties Minnesota (Chicago: H.C. Cooper, Jr., & Co., 1910), vol. 1, 342.

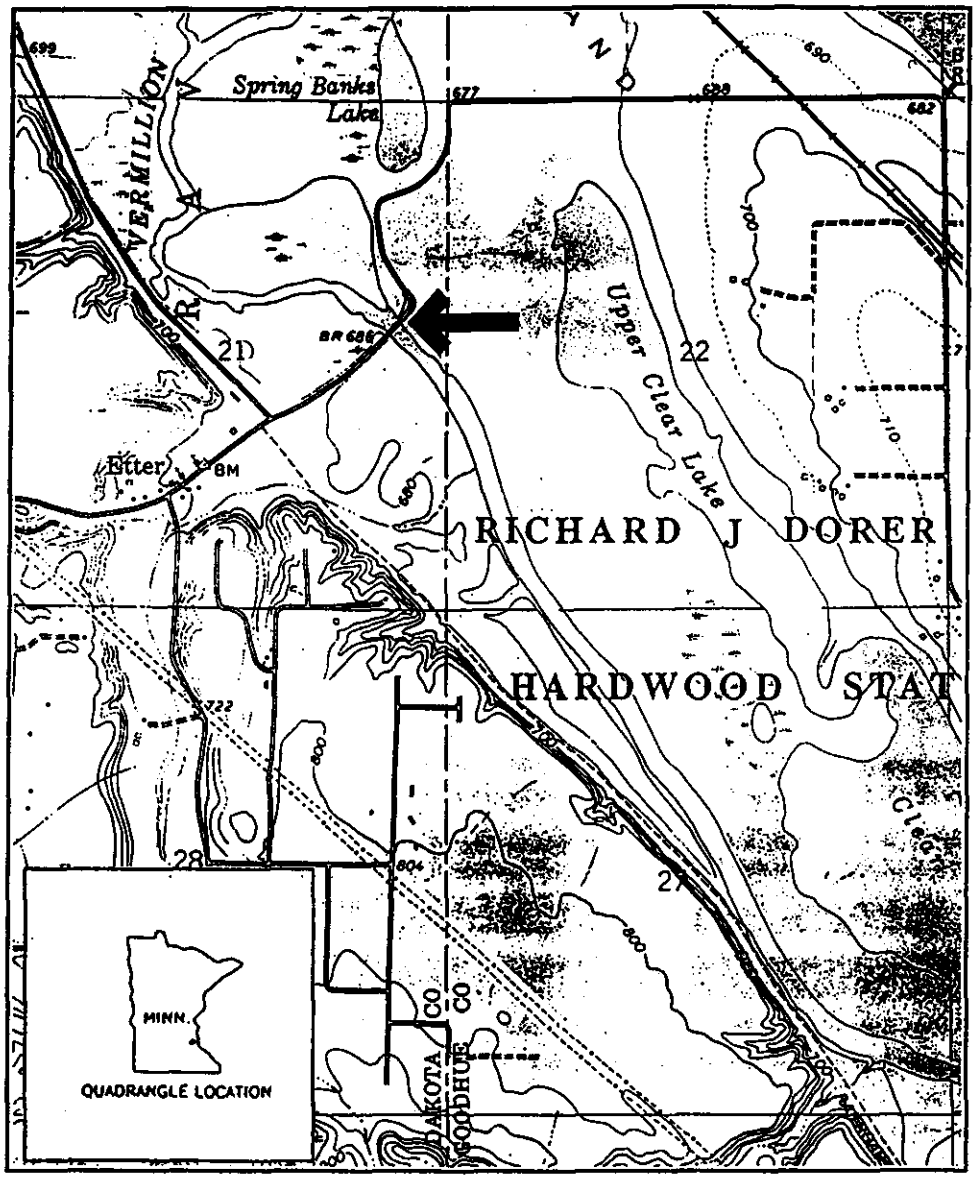

Figure 1: Map of Etter Bridge and vicinity. (Source: USGS, "Diamond Bluff West, Wisconsin-Minnesota," 7.5 Minute Series, 1974.)

(near Fort Snelling) to LaCrosse, Wisconsin, and beyond, providing a year-round connection to the east when ice stopped travel on the Mississippi. Local routes branched off from this axis. One was an alternative route to Hastings, laid out by Thomas Ellis in 1856, which followed the western bank of the Vermillion River after heading north from the military route in Section 33 of Ravenna Township.[2]

Overland travel was significantly improved in 1871, when the Milwaukee and Saint Paul (later the Chicago, Milwaukee and Saint Paul) Railroad joined Saint Paul and Winona. The route generally followed the western bank of the Mississippi River, stimulating new settlement and economic development. Soon thereafter, the link was finished to Milwaukee. For the first time, "it was possible to go the whole way from Minnesota to New York by train, and, perhaps, more important, to have regular freight connections by rail between West and East."[3]

In Ravenna Township, the railroad ran along the Vermillion River, roughly paralleling the military road a mile or two to the southwest. Etter Station was one of the new railroad communities, established in 1871 where the Ellis road approached the Vermillion River from the south. It was named for A.W. Etter, who owned the land on which the station was built and who was appointed the first postmaster. The area quickly became a center of business: "In 1873, Mr. Etter opened a stock of general merchandise, which he kept about three years. In 1871 or 1872, a blacksmith shop was opened by August Behrmann. In 1873, Mr. Etter built a warehouse, for the purpose of buying wheat." His activity was timely. Dakota County's

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[2] Arthur J. Larsen, "Roads and Trails in the Minnesota Triangle, 1849-60," Minnesota History 11 (December 1930): 389.

[3] Theodore C. Blegen, Minnesota: A History of the State, 2d ed. (Minneapolis: University of Minnesota Press, 1975), 298.

annual wheat harvest had boomed from 100,000 bushels in 1860 to 1.4 million bushels in 1870. Soon, however, most wheat production moved west with the frontier, and local agriculture diversified into dairying and livestock. While Etter Station remained a stop on the rail line, its commercial activity apparently diminished. In the early twentieth century, it is described simply as "a picturesque spot. . . . The scenery about the station is much admired by passing travelers."[4]

It is not known when the first bridge was built over the Vermillion River at this location, or what type was erected. A bridge was probably in place by the 1870s, given the commercial activity at Etter Station. The structure had deteriorated by 1886, however, when the Ravenna Township board "voted that a notice be put up on the bridge across the Ver[million] slough near Etter Station informing the public that the bridge is condemned as unsafe." Although it is not known whether the problem was remedied by repair or replacement, township records indicate that a bridge served the crossing until at least 1910. In May of that year, the town board gave Hubert Frank $18 for "raising bridge" and considered other bridge maintenance bills as well. Shortly thereafter, however, the bridge was apparently demolished and replaced by a ferry. In 1912, for example, Dakota County paid $74.44 to John Driscoll for "repairing ferry boat at Etter."[5]

The county became responsible for the crossing when it was included on the route of

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[4] A description of Etter is provided in Curtiss-Wedge, 343-345. Information on the area's wheat production is in Merrill E. Jarchow, The Earth Brought Forth: A History of Minnesota Agriculture to 1885 (St. Paul: Minnesota Historical Society, 1949), 20, 175, 286.

[5] Entries in town records include occasional payments for bridge maintenance and repair, such as construction of a "bank stone wall" on the east side in 1894; see Ravenna Town Clerk's Records in Dakota County Records, State Archives, Minnesota Historical Society, St. Paul. The county's payment is reported in the Hastings Democrat, 27 February 1913.

State Road Number 10. Counties had been given authority to designate state roads in the 1905 legislation that founded the State Highway Commission. These roads, and only these roads, were eligible for state aid. Route 10 was apparently created by the county in the early 1910s. It followed the road established by Ellis along the southwestern bank of the Vermillion River from Hastings to Etter (now Ravenna Trail/County Road 54), then turned northeast across the river to the Goodhue County line.[6]

A ferry was only a short-term solution to serve a route important enough to merit state road status. It probably required little debate when, in February 1913, the commission accepted a "petition of the Town Board of Ravenna for a bridge across the Vermillion river in sec. 21, on State Road No. 10." Commissioners Beerse and Cahill were appointed as a committee to work with the township on the project.[7]

The joint committee apparently contacted the Minnesota Highway Commission soon thereafter. Chapter 33 of the General Laws of 1911 required the commission to provide surveys, plans and specifications for all bridge work on state roads. The commission responded with plans for "Bridge No. 740," dated 8 March 1913. These drawings contain a notation that the "center line of proposed bridge [is] to be 5'-0" west of centerline of old bridge," but otherwise provide no information about the earlier structure.[8] However, the predecessor's design can be intuited from four three-foot-diameter, steel-cylinder piers currently remaining at

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[6] Dakota County Board of Commissioners Minutes, 25 February 1914, Dakota County Administration Center, Hastings, Minnesota.

[7] Commissioners Minutes, 24 February 1913.

[8] Bridge No. 740 Plans, 8 March 1913, in Bridge Files at Dakota County Highway Department, Dakota County Western Service Center, Apple Valley, Minnesota.

the site. Their placement in the river suggests that they once carried a main truss span of about 120 feet, with at least one approach span at each end.

The State Highway Commission prepared essentially the same design for the replacement structure. Its drawings for Bridge No. 740 show a seven-panel, pin-connected Pratt through truss, with single steel-stinger approach spans of 23 feet to the northeast and 30 feet to the southwest. The 173-foot-long structure has a 16-foot-wide roadway with a gravel-covered concrete deck. Each end of the truss rests on five-foot-diameter, concrete-filled steel cylinders with a plate-girder diaphragm. Abutments and wing walls are reinforced concrete. Wing walls slope away from the bridge, and hold no railing. The plans place the existing ground level considerably below the bridge deck, implying that significant fill was anticipated.

On 3 February 1914, the County Commissioners opened eight bids for building the new bridge according to the state's design. All proposals were over $8,000, and all were rejected as too expensive. The next day, the Commissioners convened at the bridge site with an engineer from the Highway Commission, who agreed to prepare a construction estimate using day labor, rather than a contractor.[9] Apparently, the need for economy also prompted a reconsideration of the bridge's proposed siting and design. Instead of moving the alignment slightly to the west, the State Highway Commission decided to place the new structure in exactly the same path as the old. At the same time, the state engineers eliminated the need for approach spans by employing a longer truss and increasing the amount of fill. Plans dated 17 March 1914 show the structure that was actually built: an 8-panel, 150-foot long, pin-connected camelback

[9] See Commissioners Minutes, 6 January 1914, and Ravenna Town Clerk's Records, 4 February 1914.

through truss, resting on reinforced concrete abutments, with recessed-panel solid concrete railings topping the wing walls. Concrete was also used for the deck of the 16-foot-wide roadway.[10]

On 10 April 1914, representatives from Dakota County, Ravenna Township, and the State Highway Commission met and decided to build the abutments with day labor. County Commissioner W.E. Beerse was authorized to hire an overseer. Work commenced immediately. Township records list payments to day laborers from Ravenna's bridge fund from April through October, with most of the work apparently finished by the end of August. Workers primarily hauled gravel, which probably provided fill for the approaches. The riverbanks at the site were low and sloped downward; plans called for the road to ascend to the bridge at a five-percent grade. The township's final tally of expenditures for Etter Bridge in 1914 totalled $2,511.28.[11]

It is unclear what work remained by March 1915, when a local newspaper reported that "the bridge committee met at the court house . . . and decided to complete the construction of the new bridge at Etter."[12] Several bills related to construction of the bridge were authorized

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[10] The switch from the Pratt to camelback configuration was dictated by the increased span length. Contemporary engineers generally considered 150 feet to mark the upper limits for the efficient use of the regular Pratt truss. For greater span lengths, the profession often prescribed Pratt variants with polygonal top chords, such as the camelback truss. For example, when the Minnesota State Highway Commission codified its design standards in 1912, it specified for "spans over 140 feet -- pin connected trusses with inclined top chords." See Minnesota State Highway Commission, Standard Specifications for Steel and Concrete Highway Bridges, Bulletin No. 9 (Minneapolis: The Thos. A. Clark Co., 1912), 6. It is uncertain how many camelback trusses were built in Minnesota in the 1910s, and exactly how many survive. A computer tabulation prepared by the Minnesota Department of Transportation in 1991 listed Bridge 740 as the longest pin-connected camelback in the state, and one of the few extant. While information on truss types in this inventory is not always completely accurate, Bridge 740 is clearly rare.

[11] Commissioners Minutes, 2 March 1915; Annual Statement of the Treasurer of the Town of Ravenna for the Year Ending March 3, 1915, in Ravenna Town Clerk's Records.

[12] Hastings Democrat, 18 March 1915, 2.

by the County Commissioners in the same month, including $1,197 for the "concrete floor and approaches," suggesting that the superstructure was in place by this time. The county also made a partial payment of $1,728 (out of a total of $1,753) to the Illinois Steel Bridge Company, which was apparently responsible for supplying materials for the superstructure. With agents based in Saint Paul, this contractor built steel and concrete bridges in Minnesota from 1910 to 1944. Records do not indicate if the firm also erected Etter Bridge, or if this was done by county crews.[13] The total construction cost for the bridge is not known.

Other than routine maintenance, the bridge has been little modified, when compared with the 1914 plans. The bridge's upper chord is formed from two channels connected by a top plate and V-lacing. The lower chord consists of two punched bars. End verticals are two back-to-back angles with square, riveted battens. Other verticals consist of two channels with V-lacing. A pair of punched bars serve as diagonals. On the southeastern web, one of the diagonal bars is missing in the fourth panel from the east; it was replaced by a cable in 1993. At the same time, another cable was added to supplement the pair of bars in the northwestern web of that panel. Single square-section rods serve as counters. Two angles form truss railings; these have been bent on the southeastern side near the northeastern portal. Portals are back-to-back angles in an "A" configuration. Sway bracing is two sets of paired back-to-back angles with V-lacing, connected by transverse, round, tension rods. Round rods also serve as top laterals.

Roadway width is 14.9 feet; total deck width is 16 feet. The concrete deck has concrete curbs edged by channels. The original concrete deck, which was replaced in 1980, was

[13] "County Board Proceedings," Hastings Gazette, 20 March 1915, 1:2; Commissioners Minutes, 2 March 1915.

supported by eight rows of stringers: six I-beams and two outside channels. During reconstruction, the channels were removed and replaced by foot-long I-beam brackets paralleling the floor beams (see HAER Photograph No. MN-74-10). The I-beam floor beams are riveted to angles which are riveted to the verticals. Bottom lateral bracing is provided by square rods. The moveable end of the truss is to the southwest. Abutments, back and wing walls are of reinforced concrete. Spalling is visible, but minor. Solid concrete railings on the wing walls each have two incised, rectangular panels. Some sections of these railings have been damaged.

Etter Bridge displays a good degree of historic integrity, particularly considering its age and the high volume of traffic it carries. Because of this traffic, however, the single-lane structure is considered functionally obsolete. In addition, periodic flooding in the area inundates the approaches, forcing lengthy detours for travellers on the route. As a result, Dakota County initiated plans to replace the bridge in the mid-1980s. In 1991, the county asked the State Historic Preservation Office (SHPO) to comment on the project, since the use of federal funds for the bridge replacement triggered review under Section 106 of the National Historic Preservation Act of 1966. SHPO concluded that the bridge was eligible for the National Register of Historic Places under registration requirements for steel highway bridges in the state, and that removal of the bridge was an adverse effect. The county considered alternatives to removal, but no other options appeared feasible. The bridge was advertised for sale; relocation of the superstructure is now being evaluated by a potential buyer. This Historic American Engineering Record study, prepared between October 1993 and January 1994, also serves as mitigation of the adverse effect.

Plans on the following three pages were prepared by the Minnesota Highway Commission in 1913 and 1914. Copies are available at the Dakota County Highway Department, Dakota County Western Service Center, Apple Valley, Minnesota.

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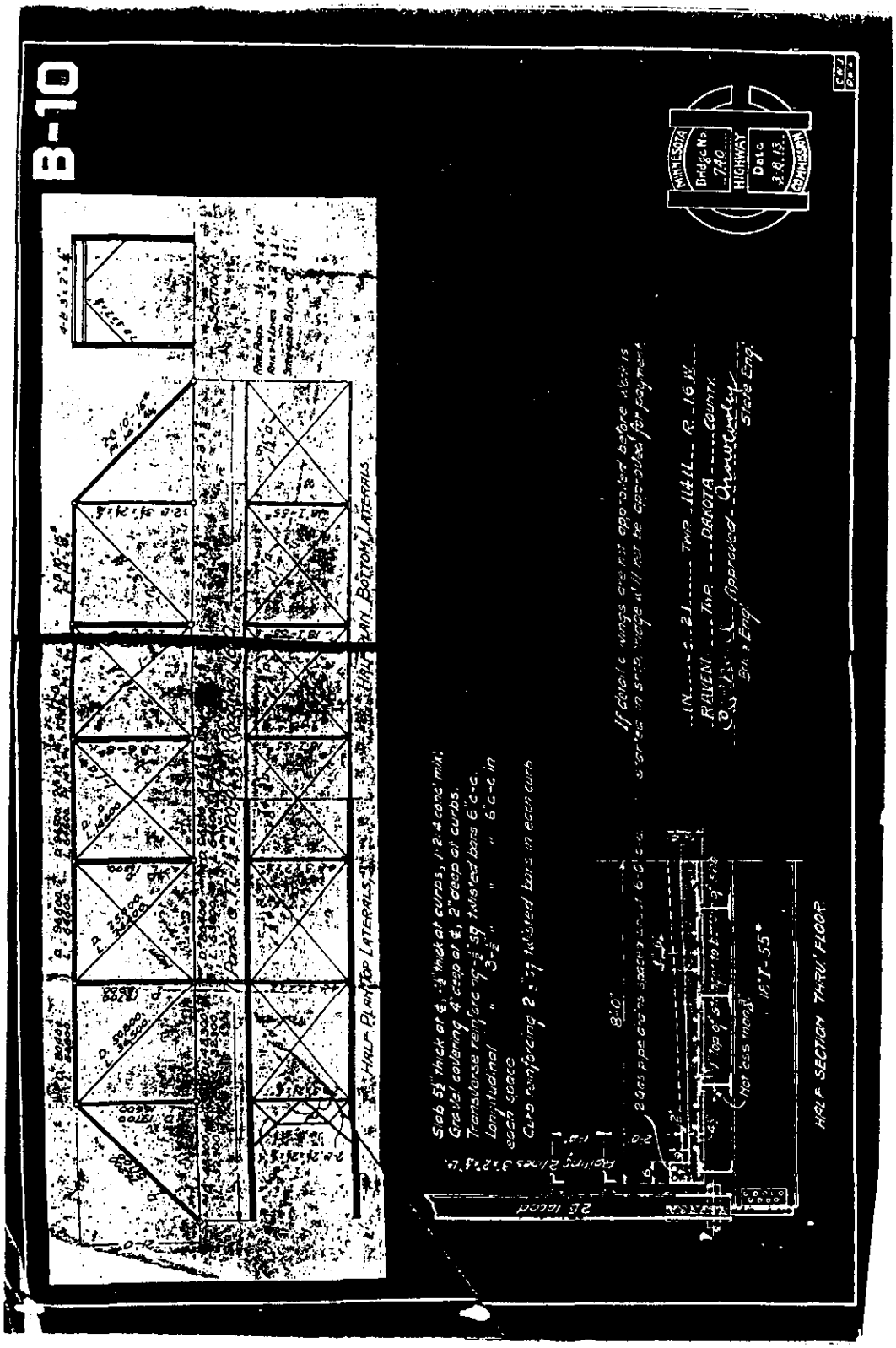
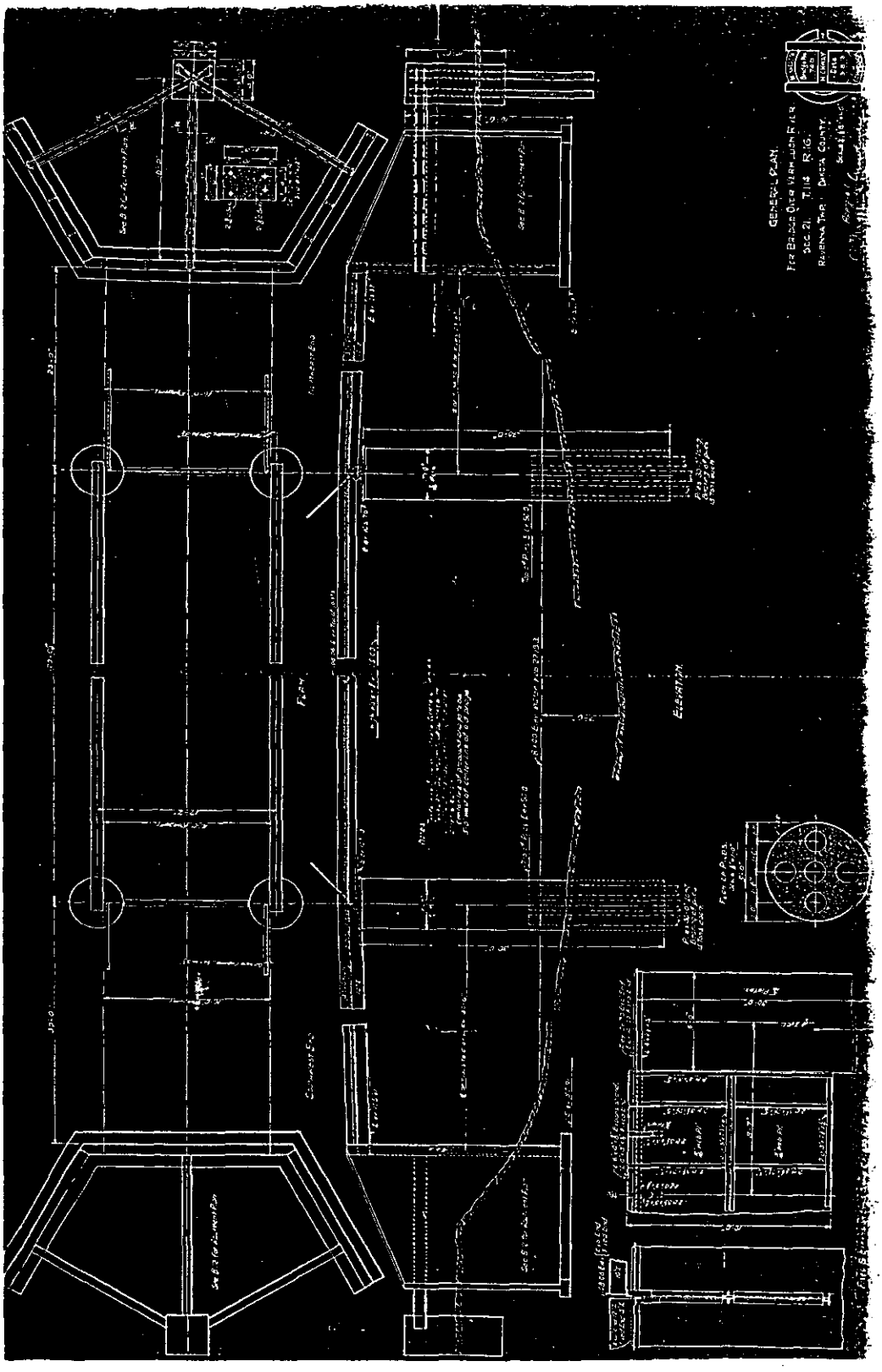
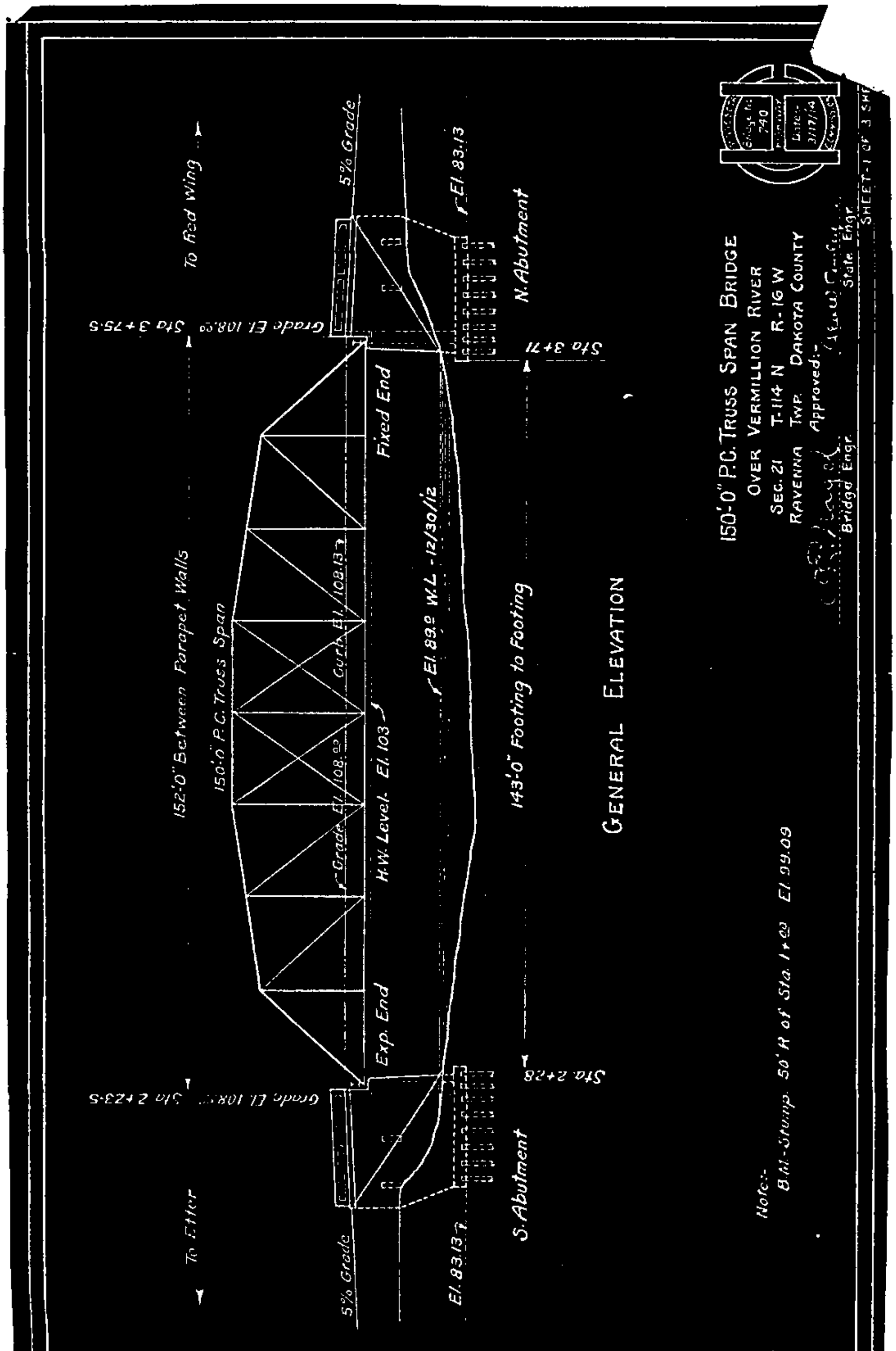



GENERAL PLAN


150'-0" P.C. Truss Span Bridge
Over Vermillion River
Sec. 21 T-114 N R-16 W
Ravenna Twp. Dakota County
Approved:-
Bridge Engr.
State Engr.
General Elevation
152'-0" Between Parapet Walls
150'-0" P.C. Truss Span
143'-0" Footing to Footing
To Red Wing
To Etter
5% Grade
5% Grade
Fixed End
Exp. End
N. Abutment
S. Abutment
El. 83.13
El. 83.13
Sta 3+71
Sta 2+28
H.W. Level El. 103
El. 89.9 W.L.-12/30/12
Note:-
B.M.-Stump. 50' R of Sta. 1+00 El. 99.09

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